

**QUARTERLY REPORT ON FULFILLMENT OF MILESTONES
PERFORMANCE PERIOD: 1 FEB 1998 TO 30 APRIL 1998**

I QUARTER

**“Study of Leukemia and Other Hematologic Diseases Among Cleanup Workers in Ukraine
Following the Chornobyl Accident” Pilot Phase.**

Performing Organization: Research Center for Radiation Medicine

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Task 1. Sampling

Milestone 1.**(epidemiological and dosimetric group)**

Works carried out on Milestone 1 and allow to respond affirmatively on main question of this task about the possibility to assemble the cohort data of individuals who had worked as Chernobyl accident clean-up workers in 1986-1990. The investigation of the State Registry allows to consider it adequate base to assemble the clean-up workers cohort that will be examined. The data base of the State Registry can provide all the scope of the personified information to create the cohort file.

Milestone 2.**(epidemiological group)**

Works carried out on Milestone 2. The epidemiological group has formed the tabulations model for the sex and age structure and territory distribution of the clean-up workers of the Chernobyl accident. The number of liquidators entered into Chernobyl registry since the till 01.09.97 is 201 817 of persons. Among them there are 190 591 of males, 11 226 of females. The majority of liquidators were in the age groups 26-30, 31-35 y.y. at the moment of the accident.

Milestone 3.**(epidemiological group)**

Works carried out on Milestone 3 and the epidemiological group have studied the procedure of record linkage in the Chernobyl Registry and evaluated its adequacy for the implementation of the Scientific Program. In the State Registry needs to link the records appear between the levels of the State Registry (district, oblast, all-country) and between the State Registry and other registries (data bases)

Milestone 4.

(epidemiological group)

For epidemiological study realization in accordance with scientific Protocol it is essential to create the automatized informational system (AIS) which will support forming the liquidators cohort file for investigation, replenishment of data base, data operation, getting of necessary reports .

Cohort data base will be created with the following steps:

- 1) creation of informational model of system;
- 2) construction of conceptual model of system;
- 3) creation of Data Base structure:
 - 3.1 choice of Data Base Management System,
 - 3.2 designing of the main informational structural massifs of the Data Base,
 - 3.3 projecting and constructing of data coding and data classification,
- 4) construction of the Data Base assembling technology and algorithms;
 - 4.1 designing of the paper carriers,
 - 4.2 organization of data collecting and transferring them to the Data Base,
 - 4.3 construction of the Data Base access procedure and interfaces for the users;
- 5) software construction and testing.

During the second quarter **informational model** was created.

Informational field was analyzed. Informational environment structural scheme is presented in the picture 1.

Diagram demonstrates informational model of the AIS taking into account structures which provide data collecting.

Among informational objects which constitute the informational model structure there are state level institutions (SCRM, UCIT & NR of Ministry of Health, Ukrainian Research Institute of oncology and Radiology) and oblast level institutions (Oblast Hospitals, Oncological dispensaries, Specialized

Dispensaries for Radiation Protection of Population (SDRPP), administrative institutions) and studied persons (subcohort members and cases).

SCRM of AMS of Ukraine is the leading institution which is responsible for the Protocol Tasks performance. Three groups are created there in accordance with the directions of the activity: epidemiological, dosimetry and haematological.

Data Coordinating Center which is built on the base of the Epidemiological group is creating and supplementing the Integrated Data Base (IDB). The main individual registered information (on about 100 000 persons), data on presence in the isolation zones, dosimetry data, medical examinations results are coming from the Chornobyl Registry Data Base.

Existence of this information permits to control cases of interest in the cohort, trace the persons included, contact with them. Chornobyl Registry Data Base is served by UCIT and NR Ministry of Health of Ukraine which is specifying and supplementing the data with the results of the yearly medical examination of sufferers.

UCIT & NR of MH of Ukraine will keep separately data of persons who will be chosen for the study. It'll simplify data interchange with the cohort IDB. UCIT & NR of MH of Ukraine will transfer information on cohort members health status to cohort IDB yearly.

Taking into account existence of different aspects of the study it is envisaged that haematological and dosimetry groups will create own data bases. They are transferring the generalized data to the cohort IDB.

Hematological working group passes such an information:

- data of persons with defined diagnosis of interest for checking whether they are cohort members and putting confirmed data in to the cohort IDB (including information for the identification, diagnosis, date of estimation, date of death).

- list of subcohort members who are haematologically examined (information for identification, system number which is given by cohort IDB, list of examinations conducted with their dates).

Dosimetry working group passes the dosimetrical investigation data of a subcohort members (including the data for identification (passport data, systemic number), dosimetry methods, it's date and results, the name of insti-

tution in which investigation was performed, experts conclusion on the dosimetry data).

Epidemiological working group passes to cohort IDB

- information on personal contacts with studied liquidators (data for identification, corrected passport data, interview and mailing results, etc.)
- retrospective information on cases of interest.

Informational requires concerning the sampling of the groups for the medical and dosimetry investigations, individual data specification, generalized information are directed from the working groups to the Data Coordinating Center. The information for experts examinations is passed from the Data coordinating Center to the working groups.

The Ukrainian Cancer-Registry which functioning is provided by the Ukrainian Research Institute of Oncology and Radiology is very important source of the information. The interchange on cases of interest data between DCC and Cancer-Registry is envisaged by means of yearly (or twice a year) conducted data linkage. The list of cohort members in the agreed form will be passed to Cancer-Registry for checking the appearance oncological diseases (including the leukemia and lymphoma) among them. Data on shown up during the Protocol performance cases with the confirmed diagnoses will be transferred from the DCC to the Cancer-Registry in the form of "Emergency report on the case of cancer for the first time in the person's life reported" (form N 090/0).

Additional information about cohort members comes from the regional establishments which are in the juridical (regional president's administration), municipal (municipal service), medical (Hematology Department, oncological Dispensary) relations with liquidators and from the personal contacts with liquidators (during the interview, examination, mailing etc.)

There are two ways of the information receipt here: active (specialists departure on the fields) and passive (from the local staff).

Information from the regions comes to the working groups on the paper carriers. Than it is specified and examined by specialists there and passed to the DCC.

Thus structure of informational elements, groups (objects) of the data which reflect some essence of object field are defined. Interrelations between working groups are planned.

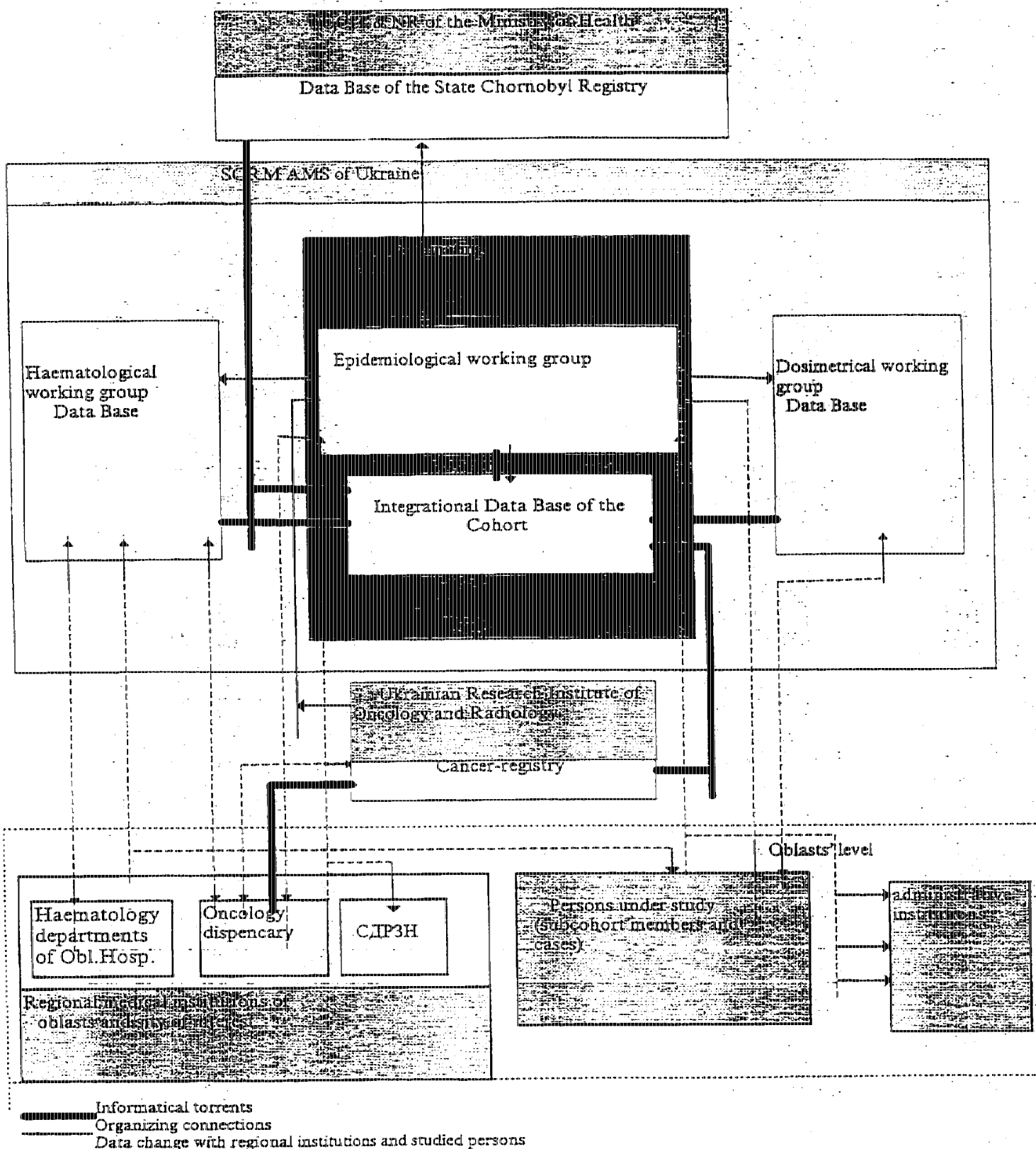
During the first quarter of task 4th performance some properties for the individual record of the cohort file were defined. These properties will be selected in the State Registry Data Base for each cohort member.

Table 1

Structure of the information which will be selected for individual record of the cohort file in the State Registry Data Base

Semantics of Table	Semantics of Field
Main Registered information	Systemic number
	Date of registration
	Date of departure
	ZKPO code
	Additional code/IIIY
	District number
	Index card number
	Individual number
	Surname
	Name
	Patronymic
	Sex
	Date of birth
	Observation category
	Registration group
	Victim category
	Victim certification series
	Victim certification number
	Date certification issued
	Office that issued the certification
	Zip code of place of residence
	Oblast code of place of residence
	District code of place of residence
	Street, house, building, apartment
	Type of clinical examination and treatment in current year
Diagnoses of chronic illnesses that were detected before 26.04.86 or before the time of entering the zone	Systemic number
	Diagnoses code 1
	Diagnoses code 2
	Diagnoses code 3
	Diagnoses code 4
	Diagnoses code 5
Presence in the isolation zones	Systemic number
	Zip code of nearest settlement

	Settlement
	Purpose for presence in zone
	Date entered zone
	Date left zone
Dosimetry data	Systemic number
	Thyroid Dose Level
	External radiation dose
Code card	Systemic number
	ZKPO code on card
	Additional code on card
	District number on card
	Index card number on card
	Date the card filled out
	Card type - adult/child
	Invalidism group
	Date transferred to invalidism
	Diagnosis for transfer to invalidism
	Group of dispensary clinical and diagnostic service
	Date of death
	Cause of death
	Social group
	Field
	Profession
	Examination at Whole Body Counter (WBC)
	Diagnosis of illness 1, for which reason victim is under dispensary observation
	Diagnosis of illness 2 for which reason victim is under dispensary observation
	Diagnosis of illness 3 for which reason victim is under dispensary observation
	Diagnosis of illness 4 for which reason victim is under dispensary observation
	Diagnosis of illness 1 first detected in the current year and that which is undergoing dispensary observation
	Diagnosis of illness 2 first detected in the current year and that which is undergoing dispensary observation
	Diagnosis of illness 3 first detected in the current year and that which is undergoing dispensary observation
	Diagnosis of illness 4 first detected in the current year and that which is undergoing dispensary observation
	Diagnosis of other illness 1 first detected in the current year
	Diagnosis of other illness 2 first detected in the current year
	Diagnosis of other illness 3 first detected in the current year
	Diagnosis of other illness 4 first detected in the current year
	Influence of harmfactor 1
	Influence of harmfactor 2
	Influence of harmfactor 3
	Influence of harmfactor 4



Picture.1. Informational model

Milestone 5.**(epidemiological group)**

For possible loose definition among potential cases and controls it is expected in the protocol to define and trace persons for whom yearly medical information has not come to the Chornobyl Registry.

It is desired to test definition and tracing of that persons in Dnipropetrovskaya oblast which is one of the regions included in the study according with the Protocol.

There are about 18.34% of liquidators who are planed to be included in the cohort resident Dnipropetrovskaya oblast.

For that aim the liquidators were chosen in the Chornobyl Registry Data Base in accordance with following criteria:

- residents of Dnipropetrovskaya oblast;
- male;
- absence of the data evident for the person's death;
- absence of the data on the last medical examination (Code Card of 1997)

The number of chosen persons is 4399. Distribution of that persons is presented in the table 1.

Table 1

Distribution of liquidators resident in Dnipropetrovskaya oblast on the period of absence of prophylactic medical examination data

Period of absence (yy)	Number of persons
1	2 138
2	635
3	615
4	346
5 and more	665
3 and more	1626

It is desired that liquidators lost to follow up are persons for whom information on medical examination has not come to the Chornobyl Registry for three (1995, 1996, 1997) and more years. The file with data of such persons is created for consequent tasks performance. File consists of information of 1626 persons and includes:

- 1626 records of the main registered data (passport information, period of presence in the isolation zones, dosimetry data);

- 1343 records of the data on the last medical examination.

50 persons were random selected in the file for consequent tracing. Thus the base for consequent task performance is formed.

Milestone 7.

(hematological group)

At the II quarter the search of the clean-up workers with the dose of radiation above 0,5 Gy have been conducted in the archives of the departments of the Institute of Clinical Radiology of the RCRM AMS of Ukraine, of irradiation pathology department of the 25-th local hospital and MIA hospital.

At the I quarter 292 patients under the observation and medical treatment in the hospital were identified who had the dose from 0,5 to 1,67 Gy.

Among this group in any case the acute irradiation syndrome was diagnosed. Besides also a group of persons 176 in number who had the acute irradiation syndrome has been detached.

At the II quarter 326 persons with the dose above 0,5 Gy were identified. So 618 persons with the dose of irradiation from 0,5 to 1,67 Gy have been identified during the I and II quaters. 10 000 medical documents have been looked through in the archives of the Institute of Clinical Radiology. This group do not include the persons who suffered from acute radiation sickness.

So at the end of the II quater we have collected the data about 794 persons with the dose above 0,5 Gy. The search of these kind of persons should be continued using of the medical records data others hospitals of Ukraine. This data need to link with the State Registry Data Base to avoid of information repetition.

(epidemiological group)

The epidemiological group was responsible for forming the file with data on liquidators who are registered in the Chernobyl Registry and have a dose of irradiation officially registered higher than 0.5 Gy. For that reason Chernobyl Registry Data Base was analyzed. Persons were selected.

Information about selected persons is included in the separate file. It gives a possibility for consequent work.

File includes the main registered information, data about presence in the isolation zones, dosimetry data, results of the last medical examination (Code Card) for each person.

High dose persons distribution on dose groups and period of presence in the isolation zones is presented in the tables 1, 2.

Data confidentiality concerning the dose put into the Chernobyl Registry Data Base requires consequent examination by specialists.

It is necessary to link data on high dose persons come from the hematological group with Chernobyl Registry Data Base during the next quarter.

Table 1

Distribution of male liquidators who are registered at the Chernobyl Registry on dose groups taking into account all persons registered
(Chernobyl Registry data as of 31.12.97)

№	Dose (RAD)	Year of participation of the cleaning up work						unknown	At all
		1986	1987	1988	1989	1990	1986-1990		
1	2	3	4	5	6	7	8	9	10
1	50-54.9	25	4	2	1	1	33	0	33
2	55-59.9	20	1	0	0	0	21	0	21
3	60-64.9	20	6	4	0	0	30	2	32
4	65-69.9	11	3	0	0	0	14	1	15
5	70-74.9	8	2	0	0	0	10	0	10
6	75-79.9	4	1	0	0	0	5	0	5
7	80-84.9	7	1	1	1	0	10	0	10
8	85-89.9	1	6	0	0	0	7	0	7
9	90-94.9	4	5	0	0	1	10	0	10
10	95-99.9	4	6	3	0	0	13	0	13
11	100-104.9	8	0	0	0	0	8	0	8
12	105 & higher	96	22	15	6	4	143	1	144
13	At all	208	57	25	8	6	304	4	308

Table 2

Distribution of male liquidators who are registered at the Chernobyl Registry
excluding deads on dose groups
(Chernobyl Registry data as of 31.12.97)

№	Dose (RAD)	Year of participation of cleaning up work						Unknown	At all
		1986	1987	1988	1989	1990	1986-1990		
1	2	3	4	5	6	7	8	9	10
1	50-54.9	13	0	0	0	0	13	0	13
2	55-59.9	19	1	0	0	0	20	0	20
3	60-64.9	20	6	4	0	0	30	2	32
4	65-69.9	9	3	0	0	0	12	1	13
5	70-74.9	8	2	0	0	0	10	0	10
6	75-79.9	3	1	0	0	0	4	0	4
7	80-84.9	7	1	1	1	0	10	0	10
8	85-89.9	1	6	0	0	0	7	0	7
9	90-94.9	4	5	0	0	1	10	0	10
10	95-99.9	4	6	3	0	0	13	0	13
11	100-104.9	7	0	0	0	0	7	0	7
12	105 & higher	92	21	15	6	4	138	1	139
13	At all	187	52	23	7	5	274	4	278

Task 2: Dosimetry

Milestone 8.

(dosimetry group)

During quarter 2 we have been focussing our efforts on gathering detailed information about dosimetric files of Ukrainian organizations and facilities -- holders of primary data. As was mentioned in our previous report, the state enterprise "RADEK" (former Department of Dosimetry Control of Scientific-Production Association "Pripyat") has the largest amount of dosimetric data for civil clean-up workers. We have been trying to establish fruitful contacts with the administration of the SE "RADEK". For this purpose, the administration of SCRM has prepared the special application for submission of general information on existing data about dosimetric monitoring during clean-up. Besides, the SCRM representative visited the chief engineer of the SE "RADEK" in Pripyat town twice. Unfortunately, those contacts have met no expected success. As become clear from negotiations with the administration of the SE "RADEK", effective cooperation, including data communication, is possible only on a compensation basis. The only progress in this case is consent for a visit of SCRM representatives and demonstration of existing dosimetric information. This visit will take place in the near future.

Our contacts with representatives of archives of Civil Defense Stuff of Ukraine were more fruitful. It has been found that present data on dosimetric support of works done by Kyivsky and Prykarpatsky Military Districts (Sectors 2 and 3 of Chernobyl military group) are incomplete. Existing data cover both cadre and reservists over all clean-up. Data include information on about 35 000 names and profiles of divisions, type of contingent (commanders, logistical support, medical service, combatant forces etc.). Dosimetric part of data comprises daily monitoring with indications of used dosimetry methods. Unfortunately, all information is stored on paper media (log books, orders etc.), so that transformation to databases takes considerable time and efforts. To evaluate completeness and quality of present data, it was adopted primary to enter into computer the information about three certain subdivisions (regiments) participated in clean-up. Information about daily dose and all necessary accompanying information are supposed to be entered for each person. Subdivisions are se-

lected having regard to variety of types of clean-up works: one of them supported AC-605 during construction of Sarcophagus, another one was composed by reservists, and the third one comprised specially trained chemical forces. Investigation of features of dosimetric monitoring in these different cases will allow us to study regularities of dose formation for military forces.

Milestone 9.

(dosimetric group)

6444 letters have been sent within the framework of postal survey of liquidators, participants of 1986-1987 clean-up, who are now residents of Dnipropetrovsk Oblast. At present time, 2 201 filled questionnaires came back and 315 letters returned without response due to respondent's death or address change. The information form cards was entered to a database and analysed.

8 basic types of activities and an entry "Others" were distinguished in the questionnaire. However, as it was turned out in analysis, there is rather considerable part of respondents who worked as dosimetrists during clean-up, though this type of work was not distinguished. That is why, this group was separated in course of analysis. Thus, distribution of main types of activity takes the following form (see Fig.1.).

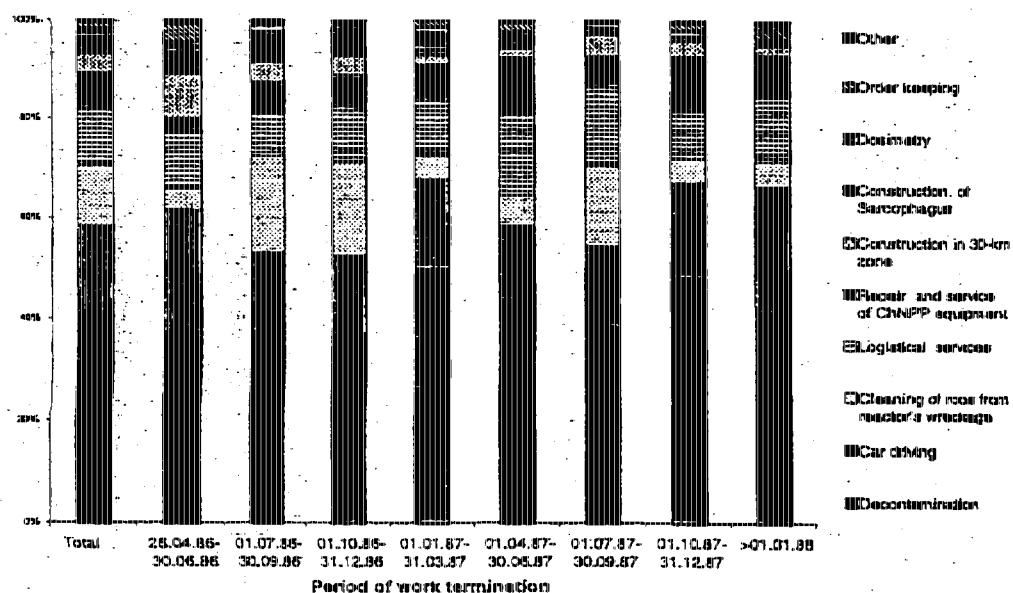


Fig.1. Distribution of main types of activities during clean-up according to periods of

work termination

Since percentage of activity has been changing over clean-up, this figure, besides the total distribution, presents its varying with termination period of work in the 30-km zone. The figure shows that for the most part, clean-up workers were occupied with decontamination works. Next major groups consist of car divers, persons who cleaned roofs from reactor's wreckage, and members of logistical services (cooking, laundry, communications, etc.).

The question about respondent's place of work offered six options for answer according to the distance from the reactor with dividing each option into two items: "Usually" (for usual work) and "In extreme cases" (for episodic work carried out under extreme conditions). The following two figures show distributions of places of work in regular and extreme conditions correspondingly. "Industrial site of Chernobyl NPP" means all territory of the plant including indoor location.

As may be seen from the figures, about 50% of works under regular conditions were carried out at the site, while, in case of extreme conditions, amount of works at the site and the station roof have approximately the same value 40%. It is well-known that these groups of liquidators are the most exposed.

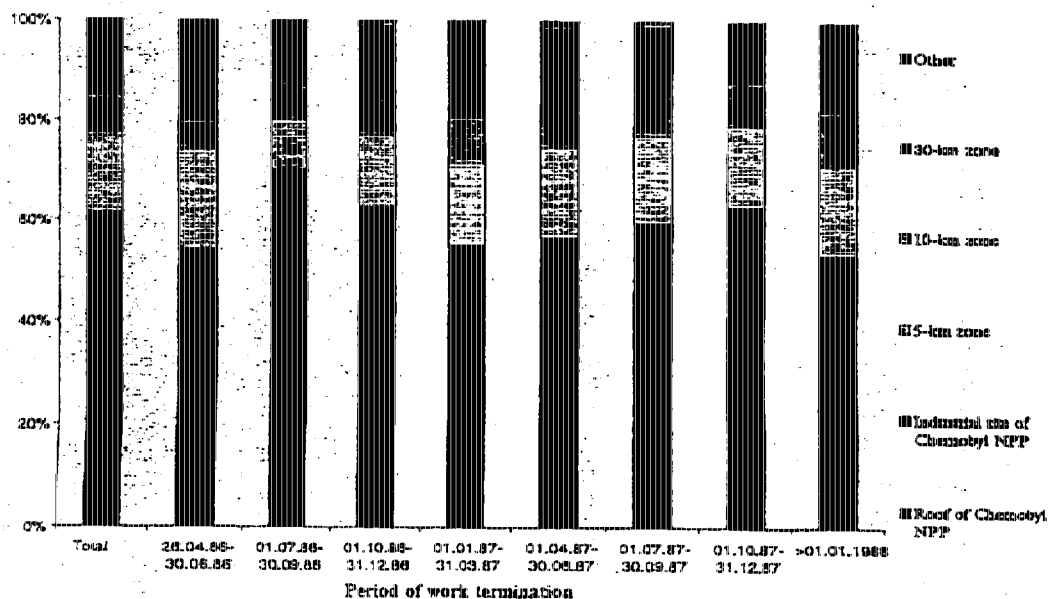


Fig.2. Distribution of main work places under usual conditions with periods of work

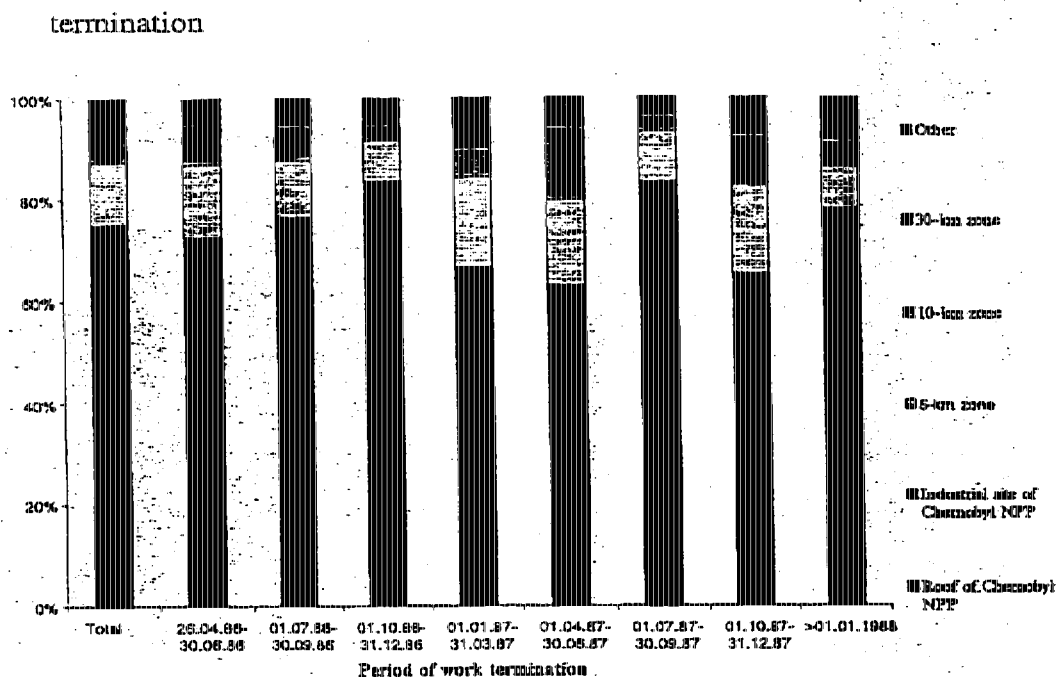


Fig.3. Distribution of main work places under extreme conditions with periods of work termination

Milestone 10. (dosimetric group)

Totally 52 candidates for analytical calculations are selected among persons who had worked at the site, donated teeth to the Bioprobe Bank and have a dose value determined by EPR-method. 26 of them participated in clean-up in 1986, 11 persons — in 1987, and 15 persons — both in 1986 and in 1987.

Milestone 11. (dosimetric group)

Experience of interviewing of liquidators using dosimetric questionnaires was learned and summarized. To provide reliable responses and avoid falsification of information, interviewers demanded from a liquidator to certify filled questionnaires and route lists by seal and signature of a person in charge at the enterprise that sent him to 30-km zone. At the same time liquidators should submit a copy of a mission certificate, or a copy of the order about mission into the 30-km zone, or a certificate of

increased payment with indication of increment rate. It should be emphasized that sole certificates of clean-up participants were not considered as complete evidence of clean-up work.

Analysis of filled in questionnaires makes possible to identify the following most typical difficulties: lack of information about precise position of liquidator's place of work with respect to different zones of the accident, disagreement between records about a place of work in the mission certificate and actual place of work, lack of documents certifying the mission of liquidator or denial of certain enterprises to certify the mission because of expiry for archive storage.

Milestone 12

(dosimetric group)

By results of fulfilment of this task has appeared that in the Registry there no information on a departmental fitting, tasks and work executed by liquidators.

(epidemiological group).

Needs for forming of new questionnaire for liquidators will be evaluated after using questionnaire.

Milestone 13

(dosimetric group)

The computer-aided inventory system Bioprobe Bank was created for automation of the process of registration of teeth samples and recording manipulation over them at every stage of storage, processing and dose determination. Besides, this system provides multi-user access to data files that represent current state of the inventory as well as history of all procedures over each sample at the Bank.

The experience of three US laboratories (*SAIC Frederick, A Division of Science Applications International Corporation, East Street Repository; Biotech Research Laboratories, Inc., A Boston Biomedica Company; A Subsidiary of Microbiological Associates*) dealing with reception, registration and storage of

the large amount of biological samples for various study was used in the process of system development.

The system consists of two main elements – software applications and information subsystem (databases). Software allows several workstations to be arranged – "Booking", "Sample Preparing", "EPR-spectrometry" and "Results of dose reconstruction" with simultaneous multi-user data management at various stages of the dose reconstruction process (to complete, edit, and look through necessary information). Each person and individual sample receive identifiers at the moment of registration. Information subsystem includes relational databases with records concerning all aspects of storage, processing and the analysis of samples received by Bioprobe Bank as well as some data about persons donated teeth and results of dose reconstruction.

Software was developed in DBMS environment *FoxBASE*.

The characteristic feature of Bioprobe Bank is maximal strict formatting and the encoding of entered parameters. This makes possible to present information in common formats for all records. Several levels of access to information allow avoiding unsanctioned change or deletion of data.

The study of 915 teeth from 659 liquidators was carried out in order to test the developed system work capacity as well as infrastructure of the Bank. Elements of the dose reconstruction procedure, the basics of registration and recording of biosamples manipulation as well as particular program modules were verified in the process of this check. Testing of the system under various operating conditions has verified main algorithms and program solutions composing the computer-aided inventory system Bioprobe Bank basis.

Milestone 14.

(dosimetric group)

Due to nondelivery of necessary EPR equipment by BRUKER firm, Task 14 was not performed in this quarter.

Milestone 15.

(dosimetric group)

According to the research plan for the reported period of time (second quarter) on milestone 15 following organization work on retrospective cytogenetic dosimetry had been carried out. Partly equipped all the premises needed for the work:

- a special sterile room for the short-term cultivation of human peripheral blood lymphocytes;

- a room for the fixation of human lymphocyte culture, preparing of fixed pellets bank, storage of fixed lymphocytes in freezer, obtaining of human metaphase chromosomes slides, treatment of slides with the help of FISH technique;

- a dark room for the fluorescent microscopy of painted chromosomes.

At same time till now we did not receive any reagent, chemical and equipment (perticularly, DNA probs, freezer, lamp and filters for luminiscent microscope and so on) needed for the cytogenetic investigations. So, we used borrowed reagents (which we must return) and fixed cells received from liquidators (the bank of pellets) we kept in home freezer of Dr. Pilinskaya.

In principal cytogenetic laboratory of RCRM is ready to establish cytogenetic dosimetry and to introduce the FISH method (whole chromosome painting) into the practice to realize the biodosimetry for the Chernobyl accident victims, under the conditions of immediately receiving the first priority equipments, reagents and materials according to the list.

In case of the lack of chemicals and equipments necessary for cytogenetical investigations and FISH technique, the further work in the frame of this part of the project will be impossible.

Milestone 16.

(dosimetric group)

According to the research plan for the reported period of time (second quarter) on milestone 16 the cytogenetics examination of 12 person - representatives of different groups of liquidators had been fulfilled. For the adaptation of the American FISH method protocol for the slides received in

Ukrainian lab (according to the preliminary understanding with Dr.G.Lifflefield) so-called "high-dose group" had been selected - 7 patients recovered from the acute radiation syndrom (ARS) of the second (4 persons) and third (3 persons) degrees of severity with absorbed doses (in accordance with the officials documents) 1.8; 2.2; 2.6; 4.0 and 4.0; 4.2; 4.8 Gy correspondingly. The blood samples were received from the department of radiation pathology of the Institute of clinical radiology RCRM. From the gematology department (headed by Dr.Klimenko) the samples of venous blood (~5 ml) from 3 patients with absorbed radiation doses 0.5; 1.2; 1.9 Gy had been obtained. From the laboratory of external radiation dosimetry (headed by Dr.Chumak) the samples of venous blood from 2 persons had been taken in the cytogenetic lab. In spite of that any reagent necessary for cytogenetic investigation had not been received till now (April, 15, 1998), all whole blood samples had been cultivated during 48 hours according to the standartized protocol adopted in the cytogenetic lab of RCRM; the fixed sediments of peripheral lymphocytes had been recieved, from the part of which the metaphase chromosome slides ready for fluorescence in situ hybridization with directly labeled DNA-probes had been obtained. For this part of work the borrowed chemicals needed for the other cytogenetic studies fulfilled by cytogenetic lab had been used. The further accumulation of the fixed cells and methaphase chromosomes slides from Chernobyl accident victims with different doses of ionizing radiation, their treatment with the help FISH method, the cytogenetical fluorescence analysis of painted chromosomes can't be carry out because of lack of the high priority reagents and equipment, namely fluorescence DNA-probes, 100 Watt lamp, specific filtres for fluorescent microscope etc. The visit of Dr.A.McFee to the cytogenetic laboratory RCRM for the adaptation of FISH method to the Ukrainian conditions and its installation into the practice (as had been come to the agreement in October, 1997) had also not been realized.

(hematological group)

At the I quarter of 1998 blood from two patients with high dose of irradiation were taken and sent to the laboratory of the biological dosimetry, where the

lymphocyte sediments are shaved out. Than the lymphocytes sediments have preserved in the cytogenetic laboratory at the temperature -18°C .

Milestone 17

(dosimetric group)

In accordance with the work plan of the second quarter, venous blood and bone marrow samples had been obtained from two patients of hematology department (head by Dr.Klimenko) - liquidators with diagnoses myelodysplastic syndrome and acute lymphoblastic leukemia receiving doses of gamma-irradiation (due to the official documents) 0.1 and 5.0 Gy correspondingly. The G-banded methaphase chromosome slides from peripheral lymphocytes of whole blood and bone marrow cells were prepared. For the analysis of G-banded chromosome slides obtained from bone marrow and peripheral lymphocytes of patients with hematological disorders Dr.O.V.Chervyakova training in one of the profile cytogenetic laboratories in USA is necessary (there is a preliminary understanding with Dr.S.Finch). This training had been planed during the first quater, but had not realize till now. Such training in the USA lab is the indespensable condition of the project implementation, especially in the part of cytogenetical diagnose of leukemia. All demerits mentioned above (lack of materials, reagents and equipmwnts; lack of training; lack of Dr.McFee visit), essentially complicated the work under the project in fixed terms.

Milestone 18

(dosimetric group)

The laboratory of external exposure dosimetry has been continuing collecting, registration, and pre-processing of tooth samples as well as entering data into Bioprobe Bank.

During the first quarter of this year 290 teeth samples of clean-up participants were collected. Among them there were 192 bioprobes from Kyiv City and Kyiv Oblast, 98 ones were sent by mail from Kharkiv (40), Dnipropetrovsk (18), Zaporizhzhya (22), and Poltava (18) Oblasts.

Unfortunately, some errors take place in the process of filling in ID forms, but we suppose to avoid incorrectness in the future.

Place of finding and owner	Name of database	Type and volume	Necessary completions
Chernobyl NPP, Chernobyl	Route lists and questionnaires of emergency workers	On paper media, 4000 questionnaires and routing sheets Total volume -- about 20000 pages	Creation of electronic database
	DB on reconstructed episodes of route lists	2133 records, episodes of work	Completely ready
	The "Sarcophagus" program	Data on exposure dose rate (EDR), α -contamination, conditions of designs, presence of fuel-containing mass, account of doses on routes movement	Completely ready
Institute of Biophysics, Moscow	Report of the Governmental Commission, 1987	On paper media in 21 volumes. Total volume -- about 4000 pages	Cleaning and updating of published materials
Institute of Biophysics and Chernobyl NPP, Moscow and Chernobyl	DB on radiation conditions in premises	2048 records	Completely ready
	DB on radiation conditions in NPP area	1860 records	It is necessary to complete the integrating module
	DB on radiation conditions in 5-km zone	1092 records	
	DB on radiation conditions in 30-km zone	5170 records	
	DB on US-605 doses	12429 records	Transferring from magnetic tapes 4000 doses (there are only 8573 records in DB)
	DB on Chernobyl NPP doses	3493('86)+ 4604('87) records	

	DB on persons sent on a mission into the 30-km zone	26296 ('86) records	
	DB on acute radiation sickness (ARS)	133 records	
	DB on WBC (Institute of Biophysics)	300 records	
	DB on WBC ("Combinat")	7496 ('86-88) records	
	DB on thyroid	711 records	
	DB on beta dose measurement	About 7000 doses on paper media	Creation of DB
	DB on the orders	8656 records	Completely ready
Military department 51105, Zagorsk	The generalizing report "Cloud"	Report on 500 pages	Transferring from magnetic tapes and creation of DB
	DB on measurements in MD51105	30000 records	
Department on dosimetry control, Prypiat	Geoinformation system (GIS) "Radiation conditions in 30-km zone"		
Archive of Ministry of Atomic Energy, Russian Federation	Archive of AC-605	2 500 000 pages	Transferring from magnetic tapes and creation of DB
Private person, Smolensk	Listing of the dose data for AC-605 in 1986-1987	32 000 records	Transferring from magnetic tapes and creation of DB
	DB on civil liquidators	42 452 (1986-1990) records	
Defense Ministry of Ukraine	Dosimetric log-books	ca. 35 000 records on paper media	Creation of DB

(hematological group)

In the 1-st quarter of the Pilot phase of the project biological materials from 3 patients with leukopenia and thrombocytopenia, 4 with myelodysplastic

syndrome patients and 2 leukemia patients with (1- chronic lymphocyte leukemia, 1 - acute leukemia) had been stored.

At the II quarter the accumulation of the biological tissues (peripheral blood and bone marrow) have been continued for investigation of the functional state of the hemopoietic cells at the long-term keeping in the low-temperature refrigerator for molecular investigation in the future.

The biological material from 2 acute leukemia patients, 2 malignant lymphomas patients and from 1 person with cytopenia were preserved for a long-term keeping.

The laboratory investigations and storage in the low-temperature refrigerator were carried out in the hematological department of the Institute of Clinical Radiology of the RCRM.

Task 3: Leukemia and Lymphoma

Milestone 20.**(hematological group)**

According to task it was necessary to investigate all cases of leukemias, lymphomas and other hematological diseases since 1986 till prescut time among the clean-up workers of the Chernobyl nuclear plant accident wich are living at 6 Ukrainian regions. During II quarter there was fulfilled the work on investigating of all cases of leukemia and lymphoma since 1987 in Sumaska and Dnipropetrivska oblasts. In order to identify leukemia, lymphoma and similar hematological diseases there were taken the medical records that are stored now in oblast's hematological and oncological departments, Kyiv Institute of hematology and blood transfusion, Research Center for Radiation Medicine of ASM of Ukraine. The diagnostic materials which is need for analyses are stored since 1987 in diagnostic laboratories of hematological departments. The rewiev of information about all leukemia, lymphoma cases since 1987 till 1997 allows more detaile study of medical documents and diagnostic samples to estimate in objective way the efficiency of diagnosis in oblasts' hematological department and institutes. All receiving medical documents now are analysed more detail.

The diagnostic materials now is revised. All patients were separated into 3 groups: patients with possible diagnosis, trustworthy diagnosis, specified diagnosis. There were analysed statistically only the trustworthy and specified diagnosis. After separating of patients group with possible diagnosis, hematologists from Sumaska and Dnipropetrivska oblasts provides the work in order to discover the diagnostic materials of these patients were investigated. After finishing the work on identification of diagnosis according to medical documents and all diagnostic materials which is conducting now by skilled hematologists of Institute of Clinical Radiology, the final information about the diagnosis will be deliver to the epidemiological group.

(epidemiological group)

During the second quarter of the Protocol performance the data on leukemia and lymphoma cases appeared in 1987-1989 among liquidators who are

residents of Dnipropetrovskaya oblast and registered in the State Chernobyl Registry were obtained by epidemiological group.

Each case tracing was performed. Preliminary examination was done.

That work results are presented in the table 1.

Table 1

Preliminary examination results on leukemia and lymphoma cases defined in 1987-1989 among liquidators resident in Dnipropetrovskaya oblast

Preliminary examination results	Registration in the State Chernobyl Registry			
	Yes	No	Not defined	At all
Diagnosis confirmed	4	1	0	5
Diagnosis is probable	1	0	1	2
Diagnosis is doubtful	1	0	0	1
Diagnosis is rejected	7	0	0	7
At all	13	1	1	15

According with the data of the State Chernobyl Registry, oblast department for dispensarisation of sufferers, hematological department of the Oblast Hospital there were 15 cases of the illness of interest registered at that time among liquidators.

After data linkage it was established that 1 (one) person of reported cases is not registered in the State Chernobyl Registry, so that is not in the cohort of interest although it's diagnosis of chronic lymphoid leukemia is confirmed.

The data of other 1 (one) person are transferred to the State Chernobyl Registry for the linkage.

Medical information of this case testify to confidentiality of it's diagnosis of Hodgkin's lymphoma.

13 persons of the cases reported are registered in the State Chernobyl Registry. After preliminary examination of medical documentation of these cases 7 (seven) diagnoses were rejected. Their data were reported because a wrong coding. 4 (four) of 13 diagnoses preliminary confirmed. These are: lymphosarcoma (200.1), acute leukemia (208.0), acute myeloblastic leukemia (205.0), chronic myeloid leukemia (205.1).

1 (one) of 13 diagnoses (which is Hodgkin's lymphoma) is probable. 1 (one) of 13 diagnoses, which is Hodgkin's lymphoma, is doubtful because of medical information lack.

Tracing is continuing.

Milestone 23.

(hematological group)

According to task it is very difficult to differentiate some preleukemic states and myeloproliferative disorders from different forms of the acute myeloid leukemia. Since they are originally coronary, they are to be examined in the spectrum of possible radiation-induced leukemia disorders. Many lymphoma forms are alike the lymphocyte leukemias, some of which are also radiation-induced. Taking into consideration these circumstances the analysis of other hematological diseases has been conducted: leukemia, myelodysplasia, polycythemia vera, essential thrombocytemia, aplastic or hypoplastic anemia, multiple myeloma, myelofibrosis, various lymphoma.

During I and II quarter of Pilot phase of the Project were investigated other hematological diseases (leukemia, myelodysplasia, polycythemia vera, essential thrombocytemia, aplastic or hypoplastic anemia, multiple myeloma, myelofibrosis, various lymphoma) at the hematological department of the 4-th local hospital of the Dnipropetrovsk city where the majority of the leukemia and lymphoma urban and rural patients are treated. People suffered following the accident on the Chernobyl NPP are also treated there.

During the I quarter were analysed the medical records of patients population of Dnipropetrovsk in 1987. Diagnosed:

- acute leukemia - 31;
- chronic lymphocytic leukemia - 427;
- chronic myeloid leukemia - 99;
- multiple myeloma - 24;
- polycythemia vera - 7;
- myelofibrosis - 33;

aplastic anemia -12.

During the II quarter were analysed the patients treated in hematological department in 1988 who living in Dnipropetrovsk city. Diagnosed:

acute leukemia - 93;

chronic lymphocytic leukemia - 208;

chronic myeloid leukemia - 83;

chronic myelomonocytic leukemia - 4;

multiple myeloma - 17;

polycythemia vera - 47;

myelofibrosis - 18;

aplastic anemia - 9.

It's necessary to mark, that the analysis of the receiving data showed that during 1987-1988 among all diseases group, patients with the chronic lymphocytic leukemia predominate. At the same time there were not patients with myelodysplastic syndrome.

The number of acute leukemias patients have increased. At the moment of investigation the non-Hodgkin's lymphoma with the bone marrow involving were not diagnosis. Probably, apparently among acute leukemia cases located all non-Hodgkin's lymphoma cases with bone marrow involving.

Milestone 24.

(hematological group)

In first quarter the meeting with the hematologists and oncologists from the Dnipropetrovsk oblast has been conducted to explained items of Pilot project and made the acquaintance of about hematological and diagnostical position in Dnipropetrovsk oblast. Besides the training on leukemia, lymphoma and myelodysplastic syndrom diagnosis has been conducted.

Task IV. Molecular biology

Milestone 26

(hematological group)

According to task during I quarter peripheral blood was taken from 10 high irradiated persons for the hematological analysis. The samples of blood from two persons was separated on the erythrocytes and mononuclears. The mononuclears isolated to preserved in the low-temperature refrigerator.

During II quarter there were investigated peripheral blood was taken from 7 high irradiated persons for the hematological analysis. The samples of blood from two persons was separated on the mononuclears, which are stored in the low-temperature refrigerator (-70° C).

Milestone 27

(hematological group)

During first quarter two patients were examined (1 - chronic myeloid leukemia and 1 - non-Hodgkin malignant lymphoma).

Patient K. was sent to be examined to the hematological department of the Institute of Clinical Radiology. Patient L. with non-Hodgkin malignant lymphoma suspected was examined in the hematological department of the 4-th Dnipropetrivsk hospital. The peripheral blood and the bone marrow were sent to the hematological department of the RCRM, where the diagnosis of malignant lymphoma was confirmed.

During II quarter in Dnipropetrivsk oblast was examined patient M. suspected with the myelodysplastic syndrome. Patient M. to be examined in the hematological department of the Institute of Clinical Radiology.

The evaluation included: peripheral blood and bone marrow analyses, cytochemical investigations and bone marrow samples for long-term storage preserved. The results of the examination this case has showed the possibility to development of myelodysplastic syndrom but its need follow-up.

The samples of peripheral blood and bone marrow are stored in the archives of hematological department of ICR. The bone marrow sample are stored in the low-temperature refrigerator.

Milestone 29**(gematological group)**

During II quarter of Pilot phase of Project was carried out the work on connection with the Registry of Ministry of Internal Affairs of Ukraine. Almost all the patients including in this Registry has the fixed dose. The doses in almost and increased more than twice. Request for this Registry was sent in order to receive the information about the persons with doses irradiation more than 0.5 Gy. We receive the possibility to investigate the medical documents of Republic Special Dispensary of Radiation Defence of People. The received data about the persons with the dose more than 0.5 Gy according to the medical documents will be data of State National Registry of Ukraine.

Milestone 30.**(hematological group)**

In order to take peripheral blood from the persons included in cohort, in April 1998, in Dnipropetrivsk was held the study of medical personal, including the especialities of routine hematological investigation, the process of taking blood in polyclinic, especialities of preparation of peripheral blood for transportation to Kyiv, and the conditions of blood transportation in low-temperature containers.

(epidemiological group)

Among liquidators who are:

- residents of Dnipropetrovskaya oblast;
- were examined in 1997 (Data on Code Card of 1997 exists);
- are still alive (as of 1997 data)

100 liquidators are selected for the consequent tracing and interview 40 of them.